

17207

21819

2 Hours / 50 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any NINE of the following:

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- a) Define:
 - (i) Accelerated motion
 - (ii) Retardation motion
- b) Why does the gun recoil when a bullet is fired from a gun?
- c) State the frequency range for ultrasonic waves.
- d) State any two criteria for selection of NDT method.
- e) State two properties of X-rays.
- f) Define intensity of illumination. State its unit.
- g) State any two properties of photon.
- h) State any two engineering application of x-rays.
- i) State work energy principle.
- j) State inverse square law of photometry.
- k) The photoelectric work function of a metal is 3eV. Calculate its threshold frequency ($h = 6.63 \times 10^{-34}$ Js)
- l) Define centripetal force. Give one example.

P.T.O.

- 2. Attempt any FOUR of the following:** **16**
- a) An object is projected upward making an angle of 40° with the horizontal with an initial speed of 50 m/s.
 - i) How far from the point of projection will the object strike?
 - ii) In how many seconds will the object reach the ground?
 - b) How many liters of water can be raised in 15 min to a height of 24 m by using a pump of 12 kW?
 - c) Explain production of ultrasonic by piezoelectric method.
 - d) A car has initial velocity of 3 m/s. It accelerates for 12 sec. at the rate 3.5 m/s^2 . Determine the final velocity and the distance travelled during this time.
 - e) State four applications of ultra sonic testing
 - f) Explain LPT method with the help of principle and experimental procedure
- 3. Attempt any FOUR of the following:** **16**
- a) Explain any four factors to be considered in acoustical planning of an auditorium.
 - b) State and explain any four factors affecting indoor lighting system.
 - c) The threshold frequency of metal is $1.11 \times 10^{15} \text{ Hz}$. If a light of frequency $1.49 \times 10^{15} \text{ Hz}$ is made incident on the metal plate, calculate the maximum K.E of ejected photoelectron (Planck's cont = $6.63 \times 10^{-34} \text{ Js}$).
 - d) Find the minimum wavelength and maximum frequency of X-ray produced by an X-ray tube working on 40 kV
($h = 6.62 \times 10^{-34} \text{ Js}$, velocity of light = $3 \times 10^8 \text{ m/s}$
 $e = 1.6 \times 10^{-19} \text{ C}$)
 - e) Define reverberation of sound. Write Sabine's formula for reverberation time. State the factors on which reverberation time depends.
 - f) (i) State three equations of motion when body is freely falling under gravity with meaning of each symbol.
(ii) State the formula for distance travelling by a body during n^{th} second in rectilinear motion with meaning of each symbol.
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